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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,798	07/07/2004	Sumio Iijima	2004_1057A	8290

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EXAMINER	
MCCRACKEN, DANIEL	

ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
08/06/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,798	IIJIMA ET AL.	
	Examiner	Art Unit	
	DANIEL C. MCCRACKEN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Citation to the Specification will be in the following format: (S. # : ¶/L) where # denotes the page number and ¶/L denotes the paragraph number or line number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

Response to Arguments, Remarks

Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. The prior art of record (Bandow) indicates – if anything – that pressure is not critical whatsoever to making "nanospheres," further buttressing the Examiner's rejection.

Applicants do still not address the written description issue with respect to distance between graphite layers. Failure to address the rejections *infra* will result in Applicants' response being held non-responsive.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 15-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. To the extent Applicants intend the "frustrum of pyramids" and "no space between the layers" language to be limiting, this limitation was not described in the specification in a way that demonstrated possession of the claimed invention. While Applicants have submitted an affidavit, this affidavit only alleges that the graphene sheets are tightly arranged as opposed having "no spaces therebetween," as required by the claims. The declaration supports the idea that onions have, in fact, been formed.

As noted in the non-final office action of 4/6/2007, graphite has a space between layers. *See also* Shriver at 352 ("The planes themselves are widely separated from each other (at 3.35 Å), which indicates that there are weaker forces between them."). Thus (at least according to a textbook on inorganic chemistry) graphite has spaces between the layers. Applicants claim that graphite doesn't have space between the layers. How is this possible? Applicants should answer this or face the response being held non-responsive. Applicants American counsel should ensure that Applicants understand what the issue is, and the issue is this: graphite has a space between the layers. Applicants are claiming a space between the layers. Is this what they mean? If it is, experimental evidence (facts, not allegations) in appropriate affidavit format that conclusively shows no space between graphite sheets is even possible and that Applicants have accomplished this, is necessary. Suffice it to say that while carbon tubes and balls are known, pyramids are not. Incredible allegations require commensurate evidence.

Claims 15-17 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Graphite has spaces inbetween the layers. *See* (Shriver at 352). Applicants have claimed it doesn't have spaces inbetween, with no guidance, experiments, etc. to state how this is accomplished. Given that an inorganic chemistry textbook states that graphite has space between the layers, burdensome and undue experimentation is necessary to practice this invention.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. The entire reference teaches each and every limitation of the rejected claims. The pinpoint citations provided are in no way to be construed as limitations of the teachings of the reference, but rather illustrative of particular instances where the teachings may be found.

Claims 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over C. Journet, et al., *Production of carbon nanotubes*, 67 Appl. Phys. A 1 (1998) (hereinafter "Journet at __") in view of Shunji Bandow, *Purification of Single-Wall Carbon Nanotubes by Microfiltration*, 101 J. Phys. Chem. B 8839 (1997) (hereinafter "Bandow at __") and Iijima, et al, *Nano-aggregates of single-walled graphitic carbon nano-horns*, Chemical Physics Letters 1999; 309: 165-170 (hereinafter "Iijima at __").

With respect to Claims 15-19, Journet discloses a method including the steps of laser ablation of a graphite target in an inert gas at a temperature above 1000 °C. *See generally* (Journet at 3, "2 Laser Ablation"). Journet generally directs the discussion towards carbon nanotubes, that is, it does not disclose *in haec verba* "graphite nanospheres." Bandow however discloses that a laser ablation process necessarily produces the graphite nanospheres of the claimed invention. *Compare* (Bandow at 8839, Col. 1) ("In both the laser vaporization and electric arc methods for SWNT production, *a considerable (or even dominant) fraction of the carbon generated is in the form of sp^2-bonded carbon nanoshperes (CNS).*") (citation omitted, emphasis added) *with* (S. 6, 4) ("The chemical bond may be a bond between sp2 six-membered rings.).

As to the pressure and gas limitations found in Claims 15-18, Journet discloses "This is not surprising since the experimental conditions depend on various parameters such as the metal concentration [5–24], *the inert-gas pressure*, *the nature of the gas* [25], the current, and the geometry of the system." (Journet at 3, Col 1.) (emphasis added). Further, Journet explicitly states "all the techniques described in this report reflect the current state of the art and *still need to be optimized*." (Journet at 1, Col. 1) (emphasis added). To the extent Journet does not explicitly recite the claimed pressure limitation, "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art." *In re Boesch*, 205 USPQ 215, 219 (CCPA 1980) (citations omitted).

Clearly, the prior art teaches that pressure, temperature and gas are result-effective variables, the optimization of which does not impart patentability. To the extent neither Journet nor Bandow *may* not provide any teaching, suggestion or motivation to utilize the higher pressure range as claimed, Iijima does. *See* (Iijima at 170, col. 1) ("when the Ar gas pressure *increases*, the *graphite structure is well formed*") (emphasis added).

Conclusion

All amendments made in response to this Office Action must be accompanied by a pinpoint citation to the Specification (i.e. page and paragraph or line number) to indicate where Applicants are drawing their support.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL C. MCCRACKEN whose telephone number is (571)272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel C. McCracken/
Daniel C. McCracken
Examiner, Art Unit 1793
DCM

/Stuart Hendrickson/
Stuart L. Hendrickson
Primary Examiner